

Dellinger, Philip

From: Phillips, Robin <robin.phillips@bia.gov>
Sent: Friday, September 16, 2016 1:21 PM
To: Coleman, Sam; Dellinger, Philip
Cc: Eddie Streater
Subject: Osage Minerals Council

Sam/Philip,

Just wanted to express my appreciation again for attending the Osage Minerals Council Meeting this morning and providing an update on the status of the shut in wells in Osage County.

Thanks a bunch,

Robin

--

Robin M. Phillips
Superintendent
Osage Agency, BIA
P. O. Box 1539
813 Grandview
Pawhuska, OK 74056
918.287.5700

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Dellinger, Philip

From: Dellinger, Philip
Sent: Wednesday, September 14, 2016 2:56 PM
To: 'jayates@osagenation-nsn.gov'
Cc: Gee, Randy
Subject: In follow up to call a few minutes ago
Attachments: Osage UIC Summary.docx

Andrew, attached is the summary sheet I mentioned.

Dellinger, Philip

From: Dellinger, Philip
Sent: Wednesday, September 14, 2016 9:13 AM
To: 'Sickbert, Tim'
Subject: RE: UIC Class II, Pennsylvanian

Thanks Tim. I completely understand the concerns you describe related to historic drilling and the creation of potential conduits. Addressing artificial penetrations in the area around an injection well is a fundamental requirement of the Underground Injection Control program. I have Nancy looking in to this complaint and part of that will be a review of how this requirement was met in this case. In our Osage County UIC program, many of the shallower sands have a very low pressure (much lower than fresh water formation pressures) due to historic production. This characteristic provides an added level of safety to fresh water aquifers. I don't know if that is the case here, but in late 2014, I suggested to OCC that they start getting operators to dispose in shallower, depleted zones as a means to reduce volumes into the Arbuckle. I understand this practice is increasingly being used by operators in Oklahoma.

From: Sickbert, Tim [mailto:sickber@okstate.edu]
Sent: Tuesday, September 13, 2016 7:47 PM
To: Dellinger, Philip <dellinger.philip@epa.gov>
Cc: tsickbert@gmail.com
Subject: UIC Class II, Pennsylvanian

Phil -

Feel free to share this with Mark, or anybody for that matter.

As I understood it, Mark reported to me that local lessors have received a letter informing them that disposal well operators (lessees) plan to plug disposal wells back to the Pennsylvanian (geological age) and dispose of produced fluids in those (that) formation(s).

Mostly speculation: Historical (1910s-present) producers drilled through superior/overlying formations to access Pennsylvanian and deeper resources. Whenever these historical wells became uneconomical, the operators may or may not have adequately plugged the well back to the surface. If not adequately, the "plugged" well will today provide a hydraulic conduit for fluids to flow upward from the zone into which they are injecting into freshwater zones. Is it reasonable/possible to require that all lessees demonstrate that all historical wells within their leaseholdings have been plugged in such a manner as to prevent flow from the zone in which they intend to dispose of produced fluids into freshwater zones? While I am not aware of any law prohibiting causing earthquakes, I think we do have laws prohibiting contamination of freshwater. I hope this is clear enough. Making everything explicit would have made it 3x longer. In essence: Will disposing in the Pennsylvanian contaminate the shallow freshwater?

It was good to see Nancy, give her my best. Hope to meet you someday.

Best,
Tim

Tim Sickbert
Devon Lab Coordinator
Boone Pickens School of Geology
105 Noble Research Center
Oklahoma State University
Stillwater OK 74078

(405) 744-6358
tim.sickbert@okstate.edu

Dellinger, Philip

From: Voegeli, Jason <Jason.Voegeli@dvn.com>
Sent: Monday, September 12, 2016 2:36 PM
To: Sanborn, Kent
Cc: Lane, Willie; Hurlbut, Bill; Dellinger, Philip; Smith, Darren
Subject: RE: Requested Devon Osage County Well Data
Attachments: Osage County Monthly Pressures and Volumes .docx; Osage County Daily Pressures and Volumes.docx

Per Nancy's request this afternoon, Devon has removed the Confidential Business Information designation from the Pressure and Volume documents previously submitted. Please see attached.

Jason Voegeli

"People may doubt what you say, but will believe what you do."

From: Voegeli, Jason
Sent: Thursday, September 08, 2016 4:30 PM
To: 'Sanborn.Kent@epa.gov' <Sanborn.Kent@epa.gov>
Cc: 'Lane.Willie@epa.gov' <Lane.Willie@epa.gov>; 'Hurlbut.William@epa.gov' <Hurlbut.William@epa.gov>; 'dellinger.philip@epa.gov' <dellinger.philip@epa.gov>; Smith, Darren <Darren.Smith@dvn.com>
Subject: Requested Devon Osage County Well Data

Mr. Sanborn,

Per your email information request received by Darren Smith on September 6, 2016 please see Devon's responses below and the corresponding attachments. If you have any additional request please feel free to contact Darren Smith.

Summary of the requested EPA information to evaluate the two injections wells in Osage County.

1. Provide daily pressures and injection volumes for the 4 weeks prior to the earthquake for each well.

Daily pressures and injection volumes prior to the earthquake are provided in the attachment titled, "Confidential Business Information." Osage County Daily Pressures and Volumes.docx

2. Provide average monthly pressures and injection volumes for the year 2016 (this year).

Monthly pressures and injection volume averages for 2016 are provided in the attachment titled, "Confidential Business Information." Osage County Monthly Pressures and Volumes.docx

3. Obtain static fluid levels in the wells.

Static fluid levels obtained September 7, 2016 are provided in the attachments titled, "Rice SWD Fluid Level Combined.pdf and South Bend SWD Fluid Level Combined.pdf "

4. Provide the most recent MIT data for the wells.

- a) Injection Permits for the Rice and South Bend are provided in the attachments titled, "Rice SWD Injection Permit 2014.pdf and South Bend Injection Permit 2012.pdf "
- b) Most recent MIT data for the Rice and South Bend are provided in the attachments titled, "Rice SWD MIT 2013.pdf and South Bend SWD MIT 2013.pdf "

5. Call the Osage/UIC office and arrange to re-test (MIT) the wells again.

New MIT will be obtained September 9, 2016 at 1:00 p.m. with Osage UIC witness.

6. Review SPCC plans for both sites and ensure the plan is available to field personnel.

SPCC plans have been reviewed and are available to field personnel responsible for the Osage wells.

7. Ask the field personnel if they are aware of the permit conditions regarding well operation.

Field personnel responsible for the Osage wells are aware of the injection permit conditions and have been provided copies of the permits.

Jason Voegeli
EHS Manager - US Division

Devon Energy Corporation
333 West Sheridan
Oklahoma City, OK 73102
405-228-7787 Direct
405-229-9731 Cell

"People may doubt what you say, but will believe what you do."

From: "Sanborn, Kent" <Sanborn.Kent@epa.gov>

Date: September 6, 2016 at 11:31:20 AM CDT

To: "darren.smith@dvn.com" <darren.smith@dvn.com>

Cc: "Lane, Willie" <Lane.Willie@epa.gov>, "Hurlbut, Bill" <Hurlbut.William@epa.gov>, "Dellinger, Philip" <dellinger.philip@epa.gov>

Subject: [EXTERNAL] Required Well Data

Darren:

Here is a summary of the information we need to evaluate the two injections wells in Osage County.

1. Provide daily pressures and injection volumes for the 4 weeks prior to the earthquake for each well.

2. Provide average monthly pressures and injection volumes for the year 2016 (this year).
3. Obtain static fluid levels in the wells.
4. Provide the most recent MIT data for the wells.
5. Call the Osage/UIC office and arrange to re-test (MIT) the wells again.
6. Review SPCC plans for both sites and ensure the plan is available to field personnel.
7. Ask the field personnel if they are aware of the permit conditions regarding well operation.

Thanks Darren.

Kent W. Sanborn

Environmental Engineer/Field Inspector

EPA Region 6

Confidentiality Warning: This message and any attachments are intended only for the use of the intended recipient(s), are confidential, and may be privileged. If you are not the intended recipient, you are hereby notified that any review, retransmission, conversion to hard copy, copying, circulation or other use of all or any portion of this message and any attachments is strictly prohibited. If you are not the intended recipient, please notify the sender immediately by return e-mail, and delete this message and any attachments from your system.

Dellinger, Philip

From: Jann Hayman <jannhayman@osagenation-nsn.gov>
Sent: Thursday, September 08, 2016 7:34 AM
To: Coleman, Sam
Cc: Gee, Randy; Blanco, Arturo; Honker, William; Dellinger, Philip; Lane, Willie
Subject: RE: Osage County Wells

Hello Mr. Coleman,

The information looks good from our perspective. Thank you.

Jann

From: Coleman, Sam [mailto:Coleman.Sam@epa.gov]
Sent: Wednesday, September 07, 2016 2:33 PM
To: Jann Hayman
Cc: Gee, Randy; Blanco, Arturo; Honker, William; Dellinger, Philip; Lane, Willie
Subject: Osage County Wells

I plan to send to State shortly. Please let me know if you see any issues.

Samuel Coleman, P.E.
Deputy Regional Administrator
EPA Region 6
coleman.sam@epa.gov
214.665.2100 Ofc
214.665.3110 Direct
214.789.2016 Cell

Dellinger, Philip

From: Dellinger, Philip
Sent: Wednesday, September 07, 2016 4:09 PM
To: Coleman, Sam; t.baker@occeemail.com; Tyler Powell - OK Secretary of Energy and Environment (tyler.powell@ee.ok.gov)
Cc: Gray, David; Honker, William; Blevins, John; Lane, Willie; Brown, Jamesr; Payne, James; Harrison, Ben
Subject: RE: Osage Well Data
Attachments: Shut in Arbuckle Wells Osage County.xlsx

There are actually 2 wells. Attached is updated spreadsheet.

From: Coleman, Sam
Sent: Wednesday, September 07, 2016 3:02 PM
To: t.baker@occeemail.com; Tyler Powell - OK Secretary of Energy and Environment (tyler.powell@ee.ok.gov) <tyler.powell@ee.ok.gov>
Cc: Gray, David <gray.david@epa.gov>; Honker, William <honker.william@epa.gov>; Blevins, John <Blevins.John@epa.gov>; Lane, Willie <Lane.Willie@epa.gov>; Dellinger, Philip <dellinger.philip@epa.gov>; Brown, Jamesr <brown.jamesr@epa.gov>; Payne, James <payne.james@epa.gov>; Harrison, Ben <Harrison.Ben@epa.gov>
Subject: Osage Well Data

We just got off the phone with Osage Nation. Chief Standing Bear wants to share data and to work with the State. He emphasized that sharing data does not imply a sharing of jurisdiction and asked that we discuss that issue further. This spreadsheet has 16 wells. Well no 1A-17 and 1-17 (Operated by Nadel) are apparently on the same location. We are checking to verify that there are actually two wells or just one with duplicate numbers. Our initial statements all say that there are 17 wells, so we will clarify shortly.

Samuel Coleman, P.E.
Deputy Regional Administrator
EPA Region 6
coleman.sam@epa.gov
214.665.2100 Ofc
214.665.3110 Direct
214.789.2016 Cell

Dellinger, Philip

From: Lane, Willie
Sent: Wednesday, September 07, 2016 3:17 PM
To: Dellinger, Philip; Brown, Jamesr
Subject: Fwd: Annual Reports for Osage wells
Attachments: Annual Reports 2015-2016.pdf; ATT00001.htm; Copy of Copy of DI_Arbuckle_09032016_UTM14_10mi.xlsx; ATT00002.htm

Sent from my iPhone

Begin forwarded message:

From: "Saunders, Jerry" <Saunders.Jerry@epa.gov>
To: "Blevins, John" <Blevins.John@epa.gov>, "Gilrein, Stephen" <gilrein.stephen@epa.gov>
Cc: "Lane, Willie" <Lane.Willie@epa.gov>, "Dellinger, Philip" <dellinger.philip@epa.gov>, "Brown, Jamesr" <brown.jamesr@epa.gov>
Subject: Annual Reports for Osage wells

The attachment includes the most recent annual report for 15 of the 17 wells in question. We will obtain the other two when the file room opens again.

Also, there is a tabular summary of MIT status in the second attachment

Dellinger, Philip

From: Paul Monies <PMonies@Oklahoman.com>
Sent: Tuesday, September 06, 2016 3:04 PM
To: Dellinger, Philip
Subject: Reporter inquiry--Osage County well shut-ins--The Oklahoman

Hi Mr. Dellinger,

I've also got calls and voicemail into your press office at Region 6, but can you offer some more details around EPA actions in Osage County in the wake of Saturday's M5.6 earthquake near Pawnee and the aftershocks?

1. How many wells are affected by EPA actions?
2. What is the timeframe on shutting in wells?
3. Do you have any recent reports on disposal well volumes in Osage County?

Thanks,

Paul

Paul Monies
Energy Reporter | The Oklahoman
Oklahoma City, Okla.
405.475.3930 | pmonies@oklahoman.com

PowerPlay
<http://blog.newsok.com/energy>

Dellinger, Philip

From: Dellinger, Philip
Sent: Tuesday, September 06, 2016 2:46 PM
To: mary.hale@bia.gov
Subject: FW: Scanned Document
Attachments: [Untitled].pdf

2

From: LaBorn, Mary
Sent: Tuesday, September 06, 2016 2:29 PM
To: Dellinger, Philip <dellinger.philip@epa.gov>
Subject: Fw: Scanned Document

Modification to EPA Osage County UIC Program.

From: smtp@epa.gov <smtp@epa.gov>
Sent: Tuesday, September 6, 2016 1:48 PM
To: LaBorn, Mary
Subject: Scanned Document

Please open the attached document. This document was digitally sent to you using an HP Digital Sending device.

Dellinger, Philip

From: Dellinger, Philip
Sent: Tuesday, September 06, 2016 2:46 PM
To: mary.hale@bia.gov
Subject: FW: Scanned Document
Attachments: [Untitled].pdf

3 of 3. Let me know if you have any questions.

From: LaBorn, Mary
Sent: Tuesday, September 06, 2016 2:30 PM
To: Dellinger, Philip <dellinger.philip@epa.gov>
Subject: Fw: Scanned Document

Authorization to Convert Well to an Injection Well under the UIC Program Osage Mineral Reserve.

From: smtp@epa.gov <smtp@epa.gov>
Sent: Tuesday, September 6, 2016 1:49 PM
To: LaBorn, Mary
Subject: Scanned Document

Please open the attached document. This document was digitally sent to you using an HP Digital Sending device.

Dellinger, Philip

From: Dellinger, Philip
Sent: Tuesday, September 06, 2016 9:56 AM
To: jannjones_osagenation-nsn.gov
Subject: Fw: OKEQPublicNotification Pawnee
Attachments: OKEQPublicNotification Pawnee.docx

Importance: High

From: Dorsey, Nancy
Sent: Saturday, September 3, 2016 3:18 PM
To: Dellinger, Philip
Subject: FW: OKEQPublicNotification Pawnee

From: Charles Lord [mailto:C.Lord@occeemail.com]
Sent: Saturday, September 03, 2016 3:08 PM
To: Dorsey, Nancy <Dorsey.Nancy@epa.gov>
Subject: OKEQPublicNotification Pawnee

Dellinger, Philip

From: Dellinger, Philip
Sent: Tuesday, September 06, 2016 9:55 AM
To: jannjones_osagenation-nsn.gov
Subject: Fw: Emailing - AOI_09-03-2016_CL EPA Layout.pdf
Attachments: removed.txt; AOI_09-03-2016_CL EPA Layout.pdf

From: Dorsey, Nancy
Sent: Saturday, September 3, 2016 3:10 PM
To: Dellinger, Philip
Subject: FW: Emailing - AOI_09-03-2016_CL EPA Layout.pdf

From: Charles Lord [mailto:C.Lord@occemail.com]
Sent: Saturday, September 03, 2016 3:06 PM
To: Dorsey, Nancy <Dorsey.Nancy@epa.gov>
Subject: Emailing - AOI_09-03-2016_CL EPA Layout.pdf

Charles Lord
Senior Hydrologist
Oklahoma Corporation Commission
Post Office Box 52000
Oklahoma City, Oklahoma 73152
(405)522-2751
c.lord@occemail.com



Dellinger, Philip

From: Dellinger, Philip
Sent: Tuesday, September 06, 2016 9:48 AM
To: jannjones_osagenation-nsn.gov
Subject: Fw: revised table and maps - Osage Arbuckle near Earthquake
Attachments: OK_Osage09032016_10mi_v2.jpg

Hi Jann. We are having system problems. I will send you more info.

From: Dorsey, Nancy
Sent: Saturday, September 3, 2016 6:42 PM
To: Dellinger, Philip; Hurlbut, Bill; Sanborn, Kent
Subject: revised table and maps - Osage Arbuckle near Earthquake

There were more Arbuckle wells within our DI database **WITHOUT ANY LATITUDE LONGITUDE.** (This would be an overdue project making sure all our active permitted wells actually have latitude longitude!)

Nancy S. Dorsey
Environmental Scientist
Oklahoma Class II Program Manager
WQ-SG EPA Region 6
1445 Ross Ave. #1200
Dallas, TX 75202-2733
214-665-2294
FAX 214-665-2191

UIC Webpages:

<http://www.epa.gov/uic/underground-injection-control-epa-region-6-ar-la-nm-ok-and-tx>

<http://www.epa.gov/uic/guidance-documents-completing-class-i-injection-well-no-migration-petitions>

Managing and Minimizing Potential of Injection-Induced Seismicity from Class II Disposal: Practical

Approaches: <http://www.epa.gov/uic/underground-injection-control-national-technical-workgroup-final-issue-papers>

Dellinger, Philip

From: Hale, Mary <mary.hale@bia.gov>
Sent: Tuesday, September 06, 2016 8:27 AM
To: Dellinger, Philip; coleman.samuel@epa.gov
Subject: Re: earthquake update

Do I need to send out an invite to the call at 1030? People are asking me...

Jeannine Hale, Director
Division of Environmental & Cultural Resource Management
DOI BIA- Eastern Oklahoma Regional Office
3100 W. Peak Blvd
Muskogee OK 74401
918.781.4660 tel.
918.781.4667 fax

On Mon, Sep 5, 2016 at 3:37 PM, Dellinger, Philip <dellinger.philip@epa.gov> wrote:

Thanks Bill. In terms of expertise, I recommend someone knowledgeable on the Oklahoma hazard analysis and stress regime, as well as the relocation of events in the state. We are looking at 10:30 tomorrow morning and someone in our office will send you the particulars tomorrow morning.

Philip Dellinger, Chief

Ground Water/UIC Section

EPA Region 6, Dallas, TX

214-665-8324

From: William S Leith [mailto:wleith@usgs.gov]
Sent: Monday, September 05, 2016 1:49 PM
To: Coleman, Sam <Coleman.Sam@epa.gov>; Dellinger, Philip <dellinger.philip@epa.gov>; Dorsey, Nancy <Dorsey.Nancy@epa.gov>
Cc: William Andrews <wandrews@usgs.gov>; Steve Hickman <hickman@usgs.gov>; Robert A Williams <rawilliams@usgs.gov>; David Applegate <applegate@usgs.gov>; mary.hale@bia.gov
Subject: Fwd: earthquake update
Importance: High

EPA colleagues,

If you do organize a coordination call and want USGS participation, please just let us know the particulars and we will be sure to have someone (or more) join the call. Be sure to let us know what USGS information or expertise you seek.

The USGS, the Oklahoma Geological Survey, and university researchers are in the process of putting seismometers out to record aftershocks, which will help better delineate the causative fault. Right now, none of the USGS seismometers will be on tribal land (I can't speak for OGS or others).

Please also note that the earthquake may gain some additional importance and public visibility if the USGS revises its magnitude estimate to M5.7, which would make it the largest recorded earthquake in Oklahoma. We will be making a decision on that possible magnitude change tomorrow.

With regards,

—Bill

William Leith, Ph.D.

Senior Science Advisor for Earthquake

and Geologic Hazards

U.S. Geological Survey

905 National Center, Reston VA 20192

tel 703-648-6786

[if it's really urgent, don't use email]

On Sep 3, 2016, at 8:51 PM, Mary Hale <mary.hale@bia.gov> wrote:

EPA would like to coordinate a call with federal partners asap regarding UIC disposal wells in Osage County, seeking expertise as to any possible relationship to recent seismic events and

relevant legal authorities of the federal partners. They would like to have the call before Tuesday if possible.

If needed, I will go to the office on Monday to set up a conference call.

Jeannine

Sent from my iPhone

Begin forwarded message:

From: "Coleman, Sam" <Coleman.Sam@epa.gov>
Date: September 3, 2016 at 9:17:16 PM CDT
To: "mary.hale@bia.gov" <mary.hale@bia.gov>
Cc: "Honker, William" <honker.william@epa.gov>, "Gray, David" <gray.david@epa.gov>, "Curry, Ron" <Curry.Ron@epa.gov>, "Blevins, John" <Blevins.John@epa.gov>, "Edlund, Carl" <Edlund.Carl@epa.gov>, "Gilrein, Stephen" <gilrein.stephen@epa.gov>, "Coleman, Sam" <Coleman.Sam@epa.gov>
Subject: Fwd: earthquake update

Please see below. We would like to schedule a call as soon as possible to discuss how we can best work together to address the situation and its relationship to Osage County. Specifically we are interested in technical resources that BIA might have access to such as USGS or BOEM experts on seismicity. We have records on the UIC program that can be made available as needed.

I appreciate your willingness to help coordinate with Superintendent Streeter.

Please let me know via cell when we can get our respective teams together.

Samuel Coleman, P. E.,

Deputy Regional Administrator

214.665.2100 Ofc

214.665. 3110 Desk

214.665.2016 Cell

Coleman.sam@epa.gov

Sent from my iPhone

Begin forwarded message:

From: "Coleman, Sam" <Coleman.Sam@epa.gov>
Date: September 3, 2016 at 4:45:29 PM CDT
To: "Honker, William" <honker.william@epa.gov>, "Payne, James" <payne.james@epa.gov>, "Blevins, John" <Blevins.John@epa.gov>, "Blanco, Arturo" <Blanco.Arturo@epa.gov>, "Gilrein, Stephen" <gilrein.stephen@epa.gov>, "Curry, Ron" <Curry.Ron@epa.gov>, "Gray, David" <gray.david@epa.gov>
Subject: Fwd: earthquake update

We will need clarity on who and how are can take any appropriate actions on Osage Nation. This might include orders or other directives. If these should come from BIA or from the Osage Tribe needs to be determined. We also will need to assure that appropriate technical support is coordinated with all involved with UIC program.

We will need to have a call with BIA as soon as possible to coordinate our actions. Who has best contact with BIA and can arrange a call?

Samuel Coleman, P. E.,

Deputy Regional Administrator

214.665.2100 Ofc

214.665. 3110 Desk

214.665.2016 Cell

Coleman.sam@epa.gov

Sent from my iPhone

Begin forwarded message:

From: "Dellinger, Philip"
<dellinger.philip@epa.gov>
Date: September 3, 2016 at 4:35:48 PM CDT
To: "Coleman, Sam" <Coleman.Sam@epa.gov>,
"Gilrein, Stephen" <gilrein.stephen@epa.gov>,
"Honker, William" <honker.william@epa.gov>,
"Garcia, David" <Garcia.David@epa.gov>,
"Blevins, John" <Blevins.John@epa.gov>,
"Saunders, Jerry" <Saunders.Jerry@epa.gov>,
"Brown, Jamesr" <brown.jamesr@epa.gov>,
"Sanborn, Kent" <Sanborn.Kent@epa.gov>
Subject: FW: earthquake update

Below is the media advisory on OCC's action. Attached is a map of the area, part of which extends into Osage County. OCC has targeted 37 wells in the state jurisdiction area. Nancy Dorsey and Bill Hurlbut are in the office inventorying wells in this area. Nancy just reported there are 4 Osage Arbuckle disposal wells in the 5 mile perimeter extending into Osage County and 9 in the 10 mile for a total of thirteen wells under EPA jurisdiction. She is tabulating the key info for these wells.

-----Original Message-----

From: Dorsey, Nancy
Sent: Saturday, September 03, 2016 3:00 PM
To: Dellinger, Philip <dellinger.philip@epa.gov>
Subject: FW: earthquake update
Importance: High

-----Original Message-----

From: Matt Skinner
[<mailto:M.Skinner@occemail.com>]
Sent: Saturday, September 03, 2016 2:59 PM
To: Matt Skinner <M.Skinner@occemail.com>
Subject: FW: earthquake update

Media Advisory
Oklahoma Corporation Commission
Matt Skinner - Public Information Director
405-521-4180

9/3

The Oklahoma Corporation Commission's Oil and Gas Division (OGCD) is in the process of implementing a mandatory directive to shut down all Arbuckle disposal wells within a 725 square mile area, based on the location of the earthquake that occurred shortly after 7 a.m. on September 3, 2016 near Pawnee. The area includes 211 square miles of Osage County, which is outside of OGCD jurisdiction. OGCD is working with the Environmental Protection Agency, which has sole jurisdiction over disposal wells in Osage County. The EPA will determine what action to take in that area.

The action in the area will involved a total of 37 wells. The schedule for shut down will vary according to the well, but all wells will be shut down within 10 days. The schedule is necessary because of warnings from seismologists that a large scale, sudden shutdown could cause an earthquake.

<AOI_Pawnee_09-03-2016_CL Layout Final.pdf>

--

Jill McCarthy

USGS Hazards Science Center

MS 966; P.O. Box 25046

Denver, CO 80225

Dellinger, Philip

From: Dellinger, Philip
Sent: Monday, September 05, 2016 3:38 PM
To: 'William S Leith'; Coleman, Sam; Dorsey, Nancy
Cc: William Andrews; Steve Hickman; Robert A Williams; David Applegate; mary.hale@bia.gov
Subject: RE: earthquake update

Thanks Bill. In terms of expertise, I recommend someone knowledgeable on the Oklahoma hazard analysis and stress regime, as well as the relocation of events in the state. We are looking at 10:30 tomorrow morning and someone in our office will send you the particulars tomorrow morning.

Philip Dellinger, Chief
Ground Water/UIC Section
EPA Region 6, Dallas, TX
214-665-8324

From: William S Leith [mailto:wleith@usgs.gov]
Sent: Monday, September 05, 2016 1:49 PM
To: Coleman, Sam <Coleman.Sam@epa.gov>; Dellinger, Philip <dellinger.philip@epa.gov>; Dorsey, Nancy <Dorsey.Nancy@epa.gov>
Cc: William Andrews <wandrews@usgs.gov>; Steve Hickman <hickman@usgs.gov>; Robert A Williams <rawilliams@usgs.gov>; David Applegate <applegate@usgs.gov>; mary.hale@bia.gov
Subject: Fwd: earthquake update
Importance: High

EPA colleagues,

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The USGS, the Oklahoma Geological Survey, and university researchers are in the process of putting seismometers out to record aftershocks, which will help better delineate the causative fault. Right now, none of the USGS seismometers will be on tribal land (I can't speak for OGS or others).

Please also note that the earthquake may gain some additional importance and public visibility if the USGS revises its magnitude estimate to M5.7, which would make it the largest recorded earthquake in Oklahoma. We will be making a decision on that possible magnitude change tomorrow.

With regards,

—Bill

William Leith, Ph.D.
Senior Science Advisor for Earthquake
and Geologic Hazards
U.S. Geological Survey
905 National Center, Reston VA 20192
tel 703-648-6786
[If it's really urgent, don't use email]

On Sep 3, 2016, at 8:51 PM, Mary Hale <mary.hale@bia.gov> wrote:

EPA would like to coordinate a call with federal partners asap regarding UIC disposal wells in Osage County, seeking expertise as to any possible relationship to recent seismic events and relevant legal authorities of the federal partners. They would like to have the call before Tuesday if possible.

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Jeannine

Sent from my iPhone

Begin forwarded message:

From: "Coleman, Sam" <Coleman.Sam@epa.gov>
Date: September 3, 2016 at 9:17:16 PM CDT
To: "mary.hale@bia.gov" <mary.hale@bia.gov>
Cc: "Honker, William" <honker.william@epa.gov>, "Gray, David" <gray.david@epa.gov>, "Curry, Ron" <Curry.Ron@epa.gov>, "Blevins, John" <Blevins.John@epa.gov>, "Edlund, Carl" <Edlund.Carl@epa.gov>, "Gilrein, Stephen" <gilrein.stephen@epa.gov>, "Coleman, Sam" <Coleman.Sam@epa.gov>
Subject: Fwd: earthquake update

Please see below. We would like to schedule a call as soon as possible to discuss how we can best work together to address the situation and its relationship to Osage County. Specifically we are interested in technical resources that BIA might have access to such as USGS or BOEM experts on seismicity. We have records on the UIC program that can be made available as needed.

I appreciate your willingness to help coordinate with Superintendent Streeter.

Please let me know via cell when we can get our respective teams together.

Samuel Coleman, P. E.,
Deputy Regional Administrator

214.665.2100 Ofc
214.665. 3110 Desk
214.665.2016 Cell

Coleman.sam@epa.gov

Sent from my iPhone

Begin forwarded message:

From: "Coleman, Sam" <Coleman.Sam@epa.gov>
Date: September 3, 2016 at 4:45:29 PM CDT
To: "Honker, William" <honker.william@epa.gov>, "Payne, James" <payne.james@epa.gov>, "Blevins, John" <Blevins.John@epa.gov>, "Blanco, Arturo" <Blanco.Arturo@epa.gov>, "Gilrein, Stephen" <gilrein.stephen@epa.gov>, "Curry, Ron" <Curry.Ron@epa.gov>, "Gray, David" <gray.david@epa.gov>
Subject: Fwd: earthquake update

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214.665.2016 Cell

Coleman.sam@epa.gov

Sent from my iPhone

Begin forwarded message:

From: "Dellinger, Philip" <dellinger.philip@epa.gov>
Date: September 3, 2016 at 4:35:48 PM CDT
To: "Coleman, Sam" <Coleman.Sam@epa.gov>, "Gilrein, Stephen" <gilrein.stephen@epa.gov>, "Honker, William" <honker.william@epa.gov>, "Garcia, David" <Garcia.David@epa.gov>, "Blevins, John" <Blevins.John@epa.gov>, "Saunders, Jerry" <Saunders.Jerry@epa.gov>, "Brown, Jamesr" <brown.jamesr@epa.gov>, "Sanborn, Kent" <Sanborn.Kent@epa.gov>
Subject: FW: earthquake update

Below is the media advisory on OCC's action. Attached is a map of the area, part of which extends into Osage County. OCC has targeted 37

wells in the state jurisdiction area. Nancy Dorsey and Bill Hurlbut are in the office inventorying wells in this area. Nancy just reported there are 4 Osage Arbuckle disposal wells in the 5 mile perimeter extending into Osage County and 9 in the 10 mile for a total of thirteen wells under EPA jurisdiction. She is tabulating the key info for these wells.

-----Original Message-----

From: Dorsey, Nancy
Sent: Saturday, September 03, 2016 3:00 PM
To: Dellinger, Philip <dellinger.philip@epa.gov>
Subject: FW: earthquake update
Importance: High

-----Original Message-----

From: Matt Skinner
[<mailto:M.Skinner@occemail.com>]
Sent: Saturday, September 03, 2016 2:59 PM
To: Matt Skinner <M.Skinner@occemail.com>
Subject: FW: earthquake update

Media Advisory
Oklahoma Corporation Commission
Matt Skinner - Public Information Director
405-521-4180

9/3

The Oklahoma Corporation Commission's Oil and Gas Division (OGCD) is in the process of implementing a mandatory directive to shut down all Arbuckle disposal wells within a 725 square mile area, based on the location of the earthquake that occurred shortly after 7 a.m. on September 3, 2016 near Pawnee. The area includes 211 square miles of Osage County, which is outside of OGCD jurisdiction. OGCD is working with the Environmental Protection Agency, which has sole jurisdiction over disposal wells in Osage County. The EPA will determine what action to take in that area.

The action in the area will involved a total of 37 wells. The schedule for shut down will vary according to the well, but all wells will be shut

down within 10 days. The schedule is necessary because of warnings from seismologists that a large scale, sudden shutdown could cause an earthquake.

<AOI_Pawnee_09-03-2016_CL Layout Final.pdf>

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Jill McCarthy
USGS Hazards Science Center
MS 966; P.O. Box 25046
Denver, CO 80225
303-273-8579

Dellinger, Philip

From: William S Leith <wleith@usgs.gov>
Sent: Monday, September 05, 2016 1:49 PM
To: Coleman, Sam; Dellinger, Philip; Dorsey, Nancy
Cc: William Andrews; Steve Hickman; Robert A Williams; David Applegate; mary.hale@bia.gov
Subject: Fwd: earthquake update

Importance: High

EPA colleagues,

If you do organize a coordination call and want USGS participation, please just let us know the particulars and we will be sure to have someone (or more) join the call. Be sure to let us know what USGS information or expertise you seek.

The USGS, the Oklahoma Geological Survey, and university researchers are in the process of putting seismometers out to record aftershocks, which will help better delineate the causative fault. Right now, none of the USGS seismometers will be on tribal land (I can't speak for OGS or others).

Please also note that the earthquake may gain some additional importance and public visibility if the USGS revises its magnitude estimate to M5.7, which would make it the largest recorded earthquake in Oklahoma. We will be making a decision on that possible magnitude change tomorrow.

With regards,

—Bill

William Leith, Ph.D.
Senior Science Advisor for Earthquake
and Geologic Hazards
U.S. Geological Survey
905 National Center, Reston VA 20192
tel 703-648-6786
[if it's really urgent, don't use email]

On Sep 3, 2016, at 8:51 PM, Mary Hale <mary.hale@bia.gov> wrote:

EPA would like to coordinate a call with federal partners asap regarding UIC disposal wells in Osage County, seeking expertise as to any possible relationship to recent seismic events and relevant legal authorities of the federal partners. They would like to have the call before Tuesday if possible.

If needed, I will go to the office on Monday to set up a conference call.

Jeannine

Sent from my iPhone

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Jill McCarthy
USGS Hazards Science Center
MS 966; P.O. Box 25046
Denver, CO 80225

Dellinger, Philip

From: Dellinger, Philip
Sent: Sunday, September 04, 2016 12:52 PM
To: 'Tim Baker'; Charles Lord; Matt Skinner
Subject: Planned action on seismicity

Hello Tim, Charles and Matt.

In response to OCC's September 3 plan to shut in wells in a defined elongated zone, we intend, at a minimum, to implement this plan for wells in that portion of the zone extending into Osage County. We have identified the impacted wells in Osage County. Please contact me if you have questions or want to discuss. Thanks.

Philip Dellinger, Chief
Ground Water/UIC Section
EPA Region 6, Dallas, TX 75202
214-665-8324